EGLE Classroom EnviroSchool Webinar Series

October 10, 2023: Empowering Youth through Citizen and Community Science

For further resources on citizen and community science opportunities in Michigan, check out these resources shared by our presenters.

EGLE Classroom Environmental Education Resources:

- EGLE Lending Station
  - Water testing equipment and air quality sensors available to borrow at no cost!
- MEECS
  - Lessons encourage collecting local data
- EGLE Career Series
  - Learn about how EGLE staff collect and use scientific data in their everyday work
- EGLE Classroom
  - Find lots of resources for teaching about environmental topics in the classroom

General Citizen and Community Science Resources:

Citizen Science Organizations:
Sci Starter
CitizenScience.gov
CitSci.org
Field Scope
iNaturalist

Citizen Science Books:
Field Guide to Citizen Science by SciStarter – Great introduction for citizen science programs with youth
Learning Through Citizen Science: Enhancing Opportunities by Design – Free book download

Attending to Equity in Citizen Science:
- **Reimagining Equity and Values in Informal STEM Education (REVISE)** Center for the Informal STEM Education field funded by the US National Science Foundation (NSF) Advancing Informal STEM Learning (AISL) program. – InformalScience.org
- **STEM Teaching Tools Brief 74:** Designing and participating in community and citizen science efforts to support equity and justice
- Dig Into Science Module #1 – Science is for Everyone

Teaching with Citizen Science Data:

[Invitations to Inquiry with Data using Field Scope](#)

[Free Self-Paced Course for Educators on teaching with Citizen Science data](#)

Water Quality Citizen Science Resources

[MiCorps (Michigan Clean Water Corps)](#)

- [Cooperative Lakes Monitoring Program](#) – View [Individual Lake Reports](#)
- [Volunteer Stream Monitoring Program](#)
- [Volunteer Stream Cleanup Program](#)
  - o Contact Paul Steen for more information: psteen@hrwc.org
- [MiCorps Data Exchange Network](#)
- [Other EGLE and Michigan Water Quality Resources](#)

Examples of how to use macroinvertebrate sampling with students:

Option 1:

- Collect bugs day prior and prep morning of outside of school

- 20-minute presentation on importance of aquatic macroinvertebrates

- 40 minutes outdoors

  - 3 groups, 2 look at bugs and use ID guide

  - 1 goes to stream to watch sampling and talk about riparian area

Option 2:

- Collect bugs day prior and prep morning of in classroom

- 20 minute presentation on importance of aquatic macroinvertebrates

- 25 minutes looking at bugs and using the data sheet and identification guide

- 15 minutes discussing results

- Follow up classes looking at online data

[H2O Q In the Classroom](#) – Water Chemistry in the Great Lakes Region by Central Michigan University

- [Interactive map](#) of student-collected water quality data
- [Submit your own data](#) to the map
- [Lessons about water quality parameters](#) for middle and high school students

Vernal Pool Patrol – support conservation by joining the Michigan Vernal Pools Partnership

EGLE StoryMaps about Water Quality Issues

Biological Monitoring of Michigan's Rivers and Streams

Michigan Harmful Algal Blooms

EPA How's My Waterway Tool

Air Quality Citizen Science Resources

Purple Air – Real time sensors that are easy to install. They cost ~$200-300 each if you want your own for your school or facility.

Open Map – Clarity Movement

Just Air – The Data We Need to Craft the Future We Deserve (Grand Rapids, Kalamazoo, Detroit, Dearborn, Wayne County)

EPA Fire and Smoke Map - AirNow

EPA Air Quality Flag Program – Engage students in sharing air quality information with the surrounding community

- EPA also provides Air Quality Lesson Plans to go along with this program

EGLE Air Monitoring Information – Find out where EGLE monitors air quality and access lots of air quality information

Learn How Air Monitors Work (Video) – An EGLE technician walks you through an air monitoring station, explains how the equipment works, and what pollutants are measured.

EGLE Career Series - Air Inspector (Video) – Learn what a day in the life of an air quality inspector is like and what the pathway to working in air quality might entail.

Invasive Species Citizen Science Resources

Michigan Invasive Species Program – Collaboration between state agencies to identify, report, and prevent invasive species. Learn what species Michigan is concerned about and how you can help prevent them.

Midwest Invasive Species Information Network (MISIN) – Learn about invasive species and report sightings. View data of invasive species populations in the Midwest. (Connects to new MEECS Ecosystems & Biodiversity unit)

Spotted Lanternfly article from Detroit Free Press

Hydrilla Detection in MI News Article

Eyes on the Forest Tree Health Monitoring

MI Paddle Stewards

Other cool citizen science opportunities to engage your audiences:

BudBurst

FrogWatch USA

Christmas Bird Count

Project Feeder Watch

Community Collaborative Rain, Hail & Snow Network (CoCoRaHS)

And many more!

Citizen Science Research References from Presentation:

1. Aivelo, T., & Huovelin, S. (2020). Combining formal education and citizen science: a case study on students' perceptions of learning and interest in an urban rat project. Environmental Education Research, 26, 324 - 340.

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3. Hiller, S. E., & Kitsantas, A. (2014). The effect of a horseshoe crab citizen science program on middle school student science performance and STEM career motivation. School Science And Mathematics, 114, 302 - 311. https://doi.org/http://dx/doi.org/10.1111/ssm.12081

4. Morales, P. K., Roslan, N., Haas, A., & Lykins, A. D. (2021). Citizen science engagement: Lessons learned from the ClimateWatch "Scientist for a Day" program. Applied Environmental Education & Communication, 20, 393 - 405.

5. Postles, M., & Bartlett, M. (2018). The rise of BioBlitz: Evaluating a popular event format for public engagement and wildlife recording in the United Kingdom. Applied Environmental Education & Communication, 17, 365 - 379.

6. Schuttler, S. G., Sorensen, A. E., Jordan, R. C., Cooper, C., & Shwartz, A. (2018). Bridging the nature gap: Can citizen science reverse the extinction of experience?. Frontiers In Ecology And The Environment, 16, 405-411. https://doi.org/http://dx.doi.org/10.1002/fee.1826

7. Skukan, R., Borrell, Y. J., Ordás, J. M. R., & Miralles, L. (2020). Find invasive seaweed: An outdoor game to engage children in science activities that detect marine biological invasion. The Journal Of Environmental Education, 51, 335 - 346.

8. Martha C. Monroe, Richard R. Plate, Annie Oxarart, Alison Bowers & Willandia A. Chaves (2019) Identifying effective climate change education strategies: a systematic review of the research, Environmental Education Research, 25:6, 791-812, DOI: 10.1080/13504622.2017.1360842